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Horticulture and Health.

AT the Buffalo meeting of the American Association for the Advancement of Science, Professor W. R. Lazenby, of the Ohio State University and Vice-President of the section devoted to social and economic science, read an essay on the subject which we have taken as the title to this article. Using the word horticulture to include fruit-growing and vegetable-gardening in the realm of domestic art, with floriculture, which is partly industrial and partly a fine art, and landscape-gardening, which lies wholly within the province of fine art, Professor Lazenby discussed the relation of all these divisions to physical, intellectual and spiritual health. Of this broad subject we have only space to examine briefly a few phases. It will be admitted that no calling is superior to horticulture in furnishing pure air, good food, an adequate amount of muscular exercise and restful sleep, all of which are essentials to physical health. The man employed in a greenhouse or garden or an orchard spends most of his working hours in the fresh air and sunshine; his task ends with the twilight, and an unbroken rest enables him to start in the morning with his physical energies renewed. He is not shut up in a crowded workshop, but is brought into close contact with nature, and this is universally recognized as a genuine recuperative force in human life.

But what are the chances of making a livelihood in this country in branches of horticulture which offer such healthful conditions for working? Professor Lazenby asserts that few industries show fairer returns for capital and labor than the cultivation of small fruits or flowers, and there are few that can be started with such small means and have the same capacity of extension into large enterprises. Fruits and flowers are products which are in universal demand—necessities of the rich and appreciated luxuries of those in moderate circumstances. Not only in densely populated cities, but in our fashionable summer resorts, it is rare that the supply of these products exceeds the demand. Good berries and fine roses rarely lack purchasers, and the same is true of vegetables forced in winter, which, after an experience of twenty years, Professor Lazenby affirms, is a profitable industry if it is intelligently and energetically pursued. To substantiate this thesis he states that the vegetable-forcing house belonging to the horticultural department of the Ohio State University has an area of about 4,000 square feet of glass, comprising two plain structures which can be built for about $900 each; the total bench space in these two houses is a trifle over one-twentieth of an acre, and the annual sales from them during five years past have averaged about $600. The products include lettuce, radishes, beets, cucumbers and hyacinths. Besides this, there were grown in smaller quantities, for experimental purposes, parsley, peppers, eggplant, cauliflower, string-beans, onions, mushrooms and a few flowering plants. When it is considered that these houses are in use but little more than half the year the result is certainly encouraging. If small-fruit culture, floriculture and vegetable culture in summer are connected with this winter-forcing of vegetables there are few places where a small capital can be invested with greater certainty of success by an intelligent, and thrifty person. The large proportion of failures in business life is due to sharp competition and the great number of persons who are crowding into every opening. There is no such rush toward horticulture by persons of limited means, and the number of those in almost any community who are raising winter vegetables or small fruits might, perhaps, be doubled without lessening the income of any one.

Both floriculture and small-fruit culture especially commend themselves to women who are struggling to support their children in frugal independence. Wherever a small cottage can be obtained with half an acre of land with a warm southward exposure, suitable for early vegetables, the addition of a few cold frames will furnish something to sell all summer long. If a small forcing-house can be added it will give occupation during the winter months, and probably this part of the establishment can be made to bring more profit than the land. In this way Professor Lazenby urges that many a widow could find profitable and congenial employment for herself, and, perhaps, for her children at home, where she could be her own mistress, and not subject to the caprices, or possibly the injustice, of an employer. For such persons few pursuits offer greater inducements for securing a livelihood under conditions which are physically healthful and which stimulate the intellect to wholesome exercise. The experience on the vacant-lot farms in this and other cities has shown that the light work of gardening is well adapted to women, and they soon acquire a deftness and skill which seem to be essentially their own. When such a conservative institution as the Royal Gardens at Kew admits young women as students, it must be allowed that horticulture in some of its branches is one of the occupations which may be considered open to women of intelligence and industry.

Professor Lazenby claims that the practice of horticulture inculcates a reverence for honesty and truth, but we apprehend that it would be difficult to prove that horticulture as a vocation has any stronger tendency to regenerate the morals of a community than any other reputable calling honestly pursued. But there is no doubt that the atmosphere of horticulture is favorable to intellectual health and progress. It is very plain that the ampler knowledge we have of Nature's laws, and the fuller command we have of scientific truth, the better we are able to cope with the problems of practical horticulture, which means the transforming of crude and comparatively worthless material into substitutes of value for food or for administrating to our love of the beautiful. A knowledge of botany, chemistry, entomology and geology can all be utilized in floriculture, in vegetable-gardening and in fruit-growing, and any one of these occupations will stimulate the ambitious practitioner to study and cultivate his habits of observation. It is not unfair, therefore, to call horticulture an intellectual pursuit, and the highest success will come to those who keep their minds open and their mental faculties constantly alert. Finally, for those who are not in direct need of the rewards of manual labor, there is no more healthful recreation for mind or body than gardening in all its branches, and it may be added that there is no recreation which will more thoroughly satisfy the inborn longing for the beauti-

ful and the love of natural things. All who believe that there is a higher part of our nature which is worth cultivating, will recognize the æsthetic side of gardening as one of its most healthful influences.

Since horticulture offers so many advantages for healthful relaxation and profitable employment, it is logical to argue, as Professor Lazenby does, that the elements of the art ought to be taught in our common schools, especially since the world is full of men and women who are idle, and therefore both useless and unhappy, because they have never been taught to do anything. Many of the essential facts in regard to the constitution of the soil and the growth of plants can certainly be taught to children, and in a practical way girls and boys can be instructed in the methods of propagating plants from seeds and cuttings and graftings. They can learn something of the common injurious weeds and insects of the region in which they live; they can gain a familiar acquaintance with our native trees and shrubs, and learn something about our useful birds. Such instruction would not require any abridgment of the present curriculum; indeed, one practical result of the healthful variation from constant devotion to books would be greater mental alertness and aptitude for all kinds of study. Especially would this prove helpful in establishing the habit of investigating things rather than memorizing words. It would mean, too, the improvement and adornment of school-grounds, and this would have a refining influence on both teachers and pupils. It must be remembered that horticulture is something more than a mere manual calling. It is a science as well as an art; it develops the faculties of the mind just as any other branch of education does, while the practice of it would improve the bodily vigor of pupils. An elementary knowledge of gardening is the foundation of a trade or calling to every boy and girl, and, even if it was never pursued for a livelihood, there are few persons to whom such knowledge would not prove a comfort and delight. Every one who has a house with a few rods of land attached would find in it at some time of life a solace and refreshment, if not a pecuniary profit; and if modern education aims to make well-rounded men and women, it can be said for this primary instruction in gardening that it will help certainly to develop faculties which would otherwise be dormant, to furnish unfailing recreation for mind and body, and to make life fuller and richer, more natural and wholesome.

An Arizona Cactus Garden.

AN effort has been made during the past three years to bring together on the grounds of the University of Arizona all species of Cacti indigenous to the United States. This garden is, as yet, far from complete; nevertheless we now have some three hundred and fifty specimens representing more than a hundred species. The greater number of these plants have bloomed and produced fruit during the past year. Recently, quite a number of Mexican species have been added to this garden, but under our present circumstances it is not possible to grow plants which will not withstand our winter climate. In this connection I might state that we find such Mexican species as Anhalonium prismaticum, Lem., Echinocactus myriostigma, Salm., and E. ingens, Zucc., perfectly hardy at Tucson. Out of twenty-three Mexican plants of the genera Cereus and Mamillaria only half a dozen survived the frosts of last winter, while of fourteen species of Echinocactus not a single specimen was badly injured, although some of the latter have a much more southern range than the former.

The garden occupies a large triangular plat directly in front of the main University building. When plants are received they are set out in this garden, where they require little attention other than that which nature gives them. So far as possible, specimens are obtained directly from the localities in which they grow; usually a half dozen or more plants of the same species, showing as great variation as may be found. Plants obtained from dealers have, as a rule, been small and otherwise unsatisfactory when compared with those collected in the field.

The difficulties encountered in studying these plants from skeletons and dried flowers and fruits are very great, as may be noted from the unsatisfactory work that most of our recent authors on this group have given us as a result of their labor. The growing in greenhouses under an environment so entirely different from that which surrounds them in their general habitat and the publication of the results of their study is even more unsatisfactory. The founding of species on such plants, showing all the striking variations which they take on when grown in moist places, under unnatural conditions, has left us as a heritage a synonymy which it is absolutely hopeless to attempt to untangle. Our only hope of getting a correct understanding of these plants is by studying them in the field and bringing them together and growing them under conditions comforming as nearly as may be to their natural environment. The variations encountered even under normal conditions are such that one is bewildered by the multiplicity of forms representative of a single species. Not only are specific characters poorly defined, but generic ones, as yet, have not been drawn with any degree of satisfaction. Although the spine characters are fairly constant in many species, in others no dependence whatever can be placed upon them.

In this garden not only are records kept of the flowers and fruit characters of each species, but herbarium specimens are made, and photographs, from one-half to two-thirds natural size, are taken of flowering and fruiting branches, or of the entire plant if not too large.

An interesting species of Cylindropuntia grows in considerable abundance about five miles east of Tucson, but, so far as known, only in this one locality.* It seems to be nearest related to Opuntia Thurberi, Engelm., but differs from that plant, so far as one can judge from the incomplete description and examination of type material in the Engelmann herbarium, in its longer, more strongly deflexed spines, smaller and different-colored flowers, etc. It may be known from all related species by its bright scarlet fruit, four strongly deflexed spines and peculiar cork-like margin to the seeds. This plant and O. leptocaulis are the only Opuntias with which I am familiar that produce small lateral branches no larger than fully developed fruits, the function of which seems to be to drop to the ground and develop into new plants. The fruit matures in December, but remains attached to the plant until the following May. It has an agreeable acid flavor and its bright color makes it very conspicuous against the green stems.

University of Arizona. *J. W. Toumey.*

Five Ornamental Oaks.

PROFESSOR S. C. MASON, who has charge of the Horticultural Department of the State Agricultural College of Kansas, writes some interesting notes under the above title to *The Industrialist*, a bright little paper edited and published by the faculty and students of that college. While the trees are specially recommended for Kansas planting they are all good over a very wide range of territory, and they all belong to the biennial fruited section which are much more easily transplanted than the White Oaks. Indeed, Black Oaks a dozen feet high are often taken from the woods and planted in the streets of towns

* Opuntia tetracantha, n. sp. An irregular branching shrub 6 to 15 d. m. high; primary branches erect or ascending from a stout woody trunk 5 to 8 c. m. in diameter, and bearing numerous short, lateral branches at irregular intervals; ultimate branches 12 to 15 m. m. in diameter; joints cylindrical, 25 to 30 c. m. long, with a reticulated woody skeleton; tubercles at first prominent, 16 to 22 m. m. long, but on old stems more or less inconspicuous; pulvini sparingly covered with wool and bearing a small crescent-shaped tuft of light brown bristles at the upper margin; spines usually four, stout, loosely sheathed, straw-colored, strongly deflexed, flattened, 2 to 3.5 c. m. long, occasionally one or two smaller ones, not increasing in size and number after first season's growth; glands conspicuous, a half dozen or more between the spines and bristles; flowers greenish purple, 1.5 to 2 c. m. broad; fruit ovate to subglobose, narrowly but deeply umbilicate, 2 to 2.5 c. m. long, juicy, scarlet, usually nearly smooth, but sometimes some of the pulvini bearing 1 to 3 strong deflexed spines; seeds irregular, 3 to 5 m. m. in diameter, commissure broad, with conspicuous spongy appearance.

and cities in our southern states and prove among the very best of street trees. Of course, nursery-grown trees which have been transplanted once or twice are better. Some of these Oaks grow rapidly while young, and they have no superiors for ornamenting parks and roadsides. We give below the greater portion of Professor Mason's article:

Quercus rubra, the Red Oak, becomes a majestic tree of more than a hundred feet in height and six feet in diameter. It has fewer small branches than other species of the Black Oak, and the smooth, iron-gray bark of the young trees is retained to a much greater age than in others. Its range in North America, according to Professor Sargent, is from New Brunswick and Nova Scotia to Florida, and westward to Minnesota, Kansas and eastern Texas. In Kansas, it is found as far west as the valley of the Blue River; scattered along creek valleys in Wabaunsee and Geary counties, but reaching its greatest development in the Neosho and Verdigris valleys of southern Kansas, seeming to prefer rich but well-drained valley soils and lower uplands, but occasionally found in groups along the cool northern slope of some bluff fronting a small stream. It makes a very fine upward growth as a young tree, forming a smooth, clean trunk, with long, upright branches. The leaves are only slightly lobed and of a bright, rich green color. The acorn is large and long, set in a broad but very shallow cup. Altogether, this is one of the most striking of our native trees.

Quercus velutina, while a much less imposing tree, attains a good size on the clay uplands of Kansas as far west as the Blue River, and makes a very handsome tree while young. As it grows older, the dying out of the thick lateral branches disfigures it somewhat in a wild state, but this can be corrected in specimen trees by pruning as they begin to fail.

Quercus palustris, the Pin Oak, is found in large tracts along the Marias des Cygnes, Neosho and in other portions of southeastern Kansas, its range being from Massachusetts to Maryland and westward. It is found in heavy "gumbo" soil, and often where water stands for a portion of the year. The young trees grow erect in a single straight trunk, with numerous horizontal branches, the lower ones of which soon droop, often sweeping the ground. The effect on the landscape of a river-bottom filled with a broken, park-like growth of these trees is very peculiar and striking. Young specimen trees in the College grounds are among the most beautiful in our collection. They will be found well adapted to planting in the north-western portion of our city.

Quercus imbricaria, the Shingle Oak, extends from Pennsylvania westward through the central states to eastern Kansas, being found in Wyandotte, Leavenworth and Johnson counties. It differs from all other Kansas Oaks in the entire lanceolate, oblong leaf. The trees tend, like the Pin Oak, to the growth of a straight central axis, thickly set with small radiating, horizontal or drooping branches. With the abundance of shining rich green leaves, often overlapping, the trees of this species are very handsome on the lawn or in the borders of a group. They prefer rich upland soil to the bottoms, and are well adapted to general ornamental planting. Among mature trees occasional specimens may be found three feet in diameter and fifty or sixty feet high, when the bark of the trunk becomes black and deeply furrowed.

Quercus Phellos, the Willow Oak, has much the same habit of growth as the preceding, but the leaves are narrowly linear-lanceolate, and the whole aspect as little like the general conception of an Oak-tree as can be imagined. Grace and beauty are not usually regarded as characteristics of the Oak, but rather sturdiness and ruggedness. Yet the Willow Oak may well be called graceful as a young tree, and for lawn specimens and borders of groups is well worth attention. This interesting Oak is not found within our borders, but has a more southern range, south-eastern Missouri being the nearest to us.

In the sandstones of the cretaceous formation of central Kansas are found the earliest imprints of leaves and fruits of such families of trees as comprise our present forests. Among these are a few Oaks, and it is of interest to note that the leaves are of the same type as the last two species mentioned, having entire margins and linear-lanceolate or oblong leaves.

[To this list might have been added Quercus Texana, the Texas Oak, the tallest of American Oaks, and one of the most beautiful of them all. This noble tree, which probably extends to the eastern borders of Kansas, has usually been confounded with the Red Oak. Quercus coccinea, too, the Scarlet Oak, which surpasses all other Oaks in the beauty of its autumnal foliage, should not be omitted from any list of Oaks for Kansas plantations.—Ed.]

Foreign Correspondence.

London Letter.

New Plants.—A descriptive list of new garden plants of the year 1895 has just been issued from Kew, forming Appendix II. of the *Bulletin* for 1896. A similar list has been published each year since 1887, and as each list contains on an average about four hundred and fifty plants, the total number comprised in the nine lists issued will be something like four thousand. These are all either new introductions or garden hybrids of botanical as well as horticultural interest. In every case the plant is cited under its published name, followed by a reference to the publication in which it was first described, and also to a figure if one has been published. A brief description of the plant is then given, its habitat, and the name of the person in whose collection the plant was first noted or described. The following example will show how each plant is treated: "Anœctochilus Sanderianus, Kranzl. (Gards. Chron., 1895, xviii., 484), Orchideæ. Stove. Described as a probable new species. Leaves ovate, four inches long, dark olive-green with yellowish reticulations; scape one foot high, flowers pale green. Sunda Islands (F. Sander & Co.) [Since described as Macodes Sanderiana, Rolfe]." These lists are most useful to those who are interested in new plants for the garden, and they are of special value in maintaining correctness of nomenclature. I find them most helpful in various ways. It is intended to rearrange the lists in the form of one for every ten years. Compared with previous years the list for 1895 is short, the total number of new plants amounting to 363, that for the year previous being 461. The number of Orchids included in the list for 1895 is 206, the number in the year previous being 212. These figures show how preponderating a position Orchids continue to hold among garden plants. The price of the list is five pence, post free.

Hand-list of Trees and Shrubs at Kew.—The second part of this list has now been issued. The first part was noticed at some length in Garden and Forest in January last year. The list of Coniferæ, issued early this year, has also been noticed. We have now in these three lists a complete catalogue of the hardy ligneous plants cultivated in the Royal Gardens. Roughly, this comprises some three thousand species and botanical varieties, some five hundred of this number belonging to Coniferæ and eighty to Monocots. The nomenclature is practically that of the *Index Kewensis*. An enormous number of garden synonyms are quoted and placed in their proper places. This is, perhaps, the most useful feature of these lists, the aliases of many species being numerous and confusing. The accepted name of each species is printed in large type, with the author's name, a reference to a figure, and the habitat. The price of part II., which includes the genera from Gamopetalæ to Monocotyledons, is one shilling and three pence, post free, or the three lists may be had in one volume, price two shillings and four pence.

Favourite Flowers of Garden and Greenhouse.—This new serial work on cultivated plants is now being issued by Messrs. F. Warne & Co., London, who have had the work in preparation for some years and claim for it an equal share of public favor with their now well-known *Royal Natural History*. *Favourite Flowers* will contain 316 full-page octavo plates, printed in natural colors and generally life-size, with about 700 pages of descriptive letterpress. It is being issued in fifty-two weekly numbers, each one shilling, or in four quarterly bound volumes, each fifteen shillings. The plan of the work is novel. The genera are arranged and described in botanical order, beginning with Ranunculaceæ and ending with Ferns. Select species and varieties in each genus are described, and directions for their culture given. The colored plates represent one or more typical species in each genus.

The Best Roses.—A carefully prepared analysis of garden Roses is printed this week in the *Journal of Horticulture*,

from which the following may be interesting to your readers. The best of all Roses as an exhibition flower is Mrs. John Laing, Hybrid Perpetual, which since its introduction has held a first place among show Roses. Next to this are placed Ulrich Brunner and Madame Gabriel Luizet, the former standing first among crimson sorts. It is, I am told, identical with your American Beauty.* La France is given first place among Hybrid Teas, and this is, I observe in Mr. E. J. Hill's interesting note, also a favorite with you. The Teas and Noisettes are to me of more interest than any others, and the following are the best dozen sorts according to the analysis: Catherine Mermet, The Bride, Comtesse de Nadaillac, Innocente Pirola, Maman Cochet, Marie Van Houtte, Souvenir d'E. Vardon, Souvenir d'un Ami, Ernest Metz, Souvenir de S. A. Prince, Niphetos and Madame Hoste. The American variety, Bridesmaid, raised by May and sent out in 1893, stands twenty-eighth on the list of favorites. The two best Teas introduced since 1890 are, in the opinion of the leading rosarians, among nurserymen and amateurs, Maman Cochet and Bridesmaid. I feel certain that Tea and Noisette Roses are destined to take a much more prominent place in gardens even than they occupy now. Ever since the beginning of June our beds of these Roses have been gay with flowers, and now, in October, long after the Hybrid Perpetuals have ceased to do more than develop an odd flower here and there, our plants of Marie Van Houtte, Laurette Messimy, Souvenir d'un Ami, Caroline Kuster and Comtesse Riza du Parc are heavily laden with beautiful flowers and buds in all stages of development, so that, unless severe frost comes, we shall have a fine display of these Roses till well into November. Many cultivators declare that Tea Roses are too tender to be grown successfully out-of-doors, but, I say, do not believe it till you have tried them well. They were once considered hopeless at Kew.

Exhibition of Fruit.—The Royal Horticultural Society's great exhibition of fruit grown in Great Britain has been held again this year at the Crystal Palace, and, although the number of dishes staged fell short by some hundreds of those staged last year, the displayed lacked nothing in variety and quality. It is surprising how the standard varieties continue to occupy first place among the favorites; thus, in apples, the four that ranked first in popularity with exhibitors are among the best six apples grown—that is, Cox's Orange Pippin, Rebston Pippin, King of the Pippins and Warner's King. No less than one hundred and seventy-two varieties of pears were represented. There was some wisdom in the observation made at the conference that of this number one hundred and fifty could well be dispensed with. The first quartet among the one hundred and sixteen varieties shown was Pitmaston Duchess, Marie Louise, Doyenne du Comice and Beurre Diel. Coe's Golden Drop was the best plum. At the conference papers were read on Fruit as Food, The Cider and Perry Industry and Gathering and Storing Apples and Pears.

London. *W. Watson.*

New or Little-known Plants.

Restio subverticillatus.

THE illustration on p. 435 is from a photograph of a specimen of Restio subverticillatus, which has been an object of interest in one of the greenhouses at Kew for the last fifteen years. There is also a fine specimen of it in the Edinburgh Botanic Gardens. It forms an elegant mass of arching Bamboo-like culms from three to six feet long and clothed with long filamentose branchlets, a well-furnished culm suggesting a horse's tail. The plant is perennial, and it produces its culms freely, the branchlets remaining green upon them for several years. I know no plant, either indoors or out, that presents anything like the appearance of this. It might be described as a singular combination of the characters of a Rush and a Casuarina. Being a female plant, and the only one, it does not mature seeds at Kew, although it produces the small Triticum-like red spikelets on the apices of the branchlets in great abundance. It may be propagated by means of division of the root-stock or from cuttings formed of the branchlets which are borne in whorls on the culms similarly to the branchlets on Bamboos. The Kew specimen is planted in a bed of gravelly soil in a sunny position in an intermediate house; the Edinburgh plant is grown in a large pot along with Cape Heaths, etc. We find that it enjoys plenty of water always.

We are unable to find any record of the introduction of this species. Thirty years ago Dr. Masters described it under its present name in a monograph of the genus Restio, published in the *Journal of the Linnæan Society*, vol. viii., where he says that at that time it was grown in English gardens under the name of Willdenovia teres. It is a native of south Africa. The order Restiaceæ is related to the Sedges (Cyperaceæ) and comprises about twenty genera and 250 species, all natives of either south Africa or Australia. There are about a hundred species of Restio, but so far as is known only that under notice has any place in horticulture. In *The Treasury of Botany* it is stated that none of the species of Restio are "of any special interest or deserving of cultivation." We should say that in gardens where R. subverticillatus can be grown out-of-doors it would prove a highly ornamental plant for the water-side, and that it is likely to find favor as a pot-plant is seen in the fact that one of our leading nurserymen has acquired a stock of it to work it up for the market.

London. *W. Watson.*

* Rosarians in this country consider American Beauty identical with the Madame Ferdinand Jamin.

Plant Notes.

Calycanthus lavægatus.—The Sweet-scented Shrub, or Carolina Allspice, Calycanthus floridus, grows wild in the rich woods south of Virginia, and none of our native shrubs is more frequently seen in gardens new or old. Its deep wine-colored or lurid purple flowers are well known for the exquisite strawberry fragrance which they exhale when crushed. Occasionally it is killed in cold winter, but C. lavægatus, another native species, has a rather more northern range, extending along the Allegheny region well up into Pennsylvania, and it is altogether an admirable shrub. Its large oval leaves, with a rather sharp apex, are green on both sides, slightly roughened above, and its flowers are rather smaller than those of C. floridus. The leaves rarely show much autumn color, although just now some of them about this city have turned to a clear yellow, and so, by the way, have the leaves of C. floridus in Central Park. C. lavægatus is a shrub of excellent habit, its outer branches arching to the ground in a circle five or six feet across. For lawn or park planting its abundant rich-colored, healthy foliage makes it most desirable.

Cultural Department.

Utilizing Coal Ashes.

COAL ashes are gradually gaining for themselves a distinct place in horticulture. It is usually removed to the dump-heap, thrown upon the walks and drives, or used for filling where it can be well covered with the surface soil, and yet it is doubtful if a better material than coal ashes can be found for certain purposes about the greenhouse. The method of potting bulbs and burying them deeply to exclude the light, so that roots may be formed before the tops start into growth, has much to commend it, and coal ashes is one of the best materials for covering them. Their texture is such that good drainage is obtained and more air admitted than would probably enter most soils. Moreover, the ashes, being direct from the furnace, contain no form of life, either animal or vegetable, and insects do not thrive in it; hence a comparative freedom from subterranean parasites is insured, and bulbs are less liable to decay than when ordinary soil is used. A table or

Fig. 57.—Restio subverticillatus.—See page 434.

bench covered with about two inches of coal ashes, firmly compacted, makes a good place for potted plants, and for a time snails will not be troublesome; after a few months, however, the ashes become covered with dirt that has washed from the pots, and snails will venture into it. It is then time to clean the bench and add fresh ashes. Potted plants may be plunged in a bench of coal ashes with excellent results.

Cuttings from plants easy of propagation may be rooted in coal ashes, though not as readily as in the best cutting-bench sand. On the 28th of February last some Tomato cuttings

were put in the cutting bench, and at the same time an equal number of cuttings set in an adjacent bench filled with fresh coal ashes. All struck root, and on March 18th, when they were removed for potting, plants from the cutting bench had roots averaging one and a half inches in length, while those from the coal ashes had roots an inch long. The ashes did not hold moisture as long as the sand, which, perhaps, may account for the difference in length of the roots.

It is only recently that coal ashes have been used as a medium or soil in which to grow plants. Sifted to pass a screen with four meshes to the inch, and mixed with three or five per cent. of peat-moss, ashes form a soil which is at once light and friable, does not bake or puddle, and in which roots develop nicely, and the plant makes a satisfactory growth, provided there is plenty of plant-food present in a form to be taken up and assimilated. The peat-moss which has been mentioned is baled and sold for use in stables. This must also be sifted when used in making an artificial soil, and is added to the ashes to render the mixture more friable and more retentive of moisture. Plants stand more firmly in it, too, if peat-moss has been added, though some plants are known to grow well in the soil when the peat-moss has been left out entirely. A soil so constructed is practically sterile as far as plant-food is concerned. The ashes contain a little potash and phosphoric acid, but no nitrogen. The peat-moss has about one-half of one per cent. of nitrogen, but this is in a form not to be received readily by the plant. Hence it is necessary to add plant-food in order to produce a crop, but the exact amount of each chemical element necessary for the best growth and development of the plant can be determined, of course, only by experiment. Such a soil is especially valuable for use in experimental work with nitrogenous fertilizers, and has been employed for four successive seasons at the Connecticut Agricultural Experiment Station in a series of vegetation experiments to determine the relative availability of organic nitrogen, and for two seasons the same mixture has been used in greenhouse benches in studying the fertilizer requirements of forcing-house crops. Not only has this soil produced good crops with the proper application of fertilizer chemicals, but in some cases a larger yield resulted than could be obtained from a good natural soil with a liberal quantity of stable-manure added. Tomatoes, Lettuce, Radishes, Cucumbers, Melons, Cress and Carnations have been grown in it with more or less satisfactory results, while in the first series of experiments Corn, Oats and Rye were grown. Both bituminous and anthracite ashes have been used; the results have been about the same, and ashes from the two kinds of coal seem to differ very little either in physical character or chemical composition.

It is not improbable that an artificial soil consisting largely of coal ashes may soon come into commercial use for greenhouse work. The freedom from all living organisms is a strong point in favor of such a soil. Nematode-galls will not be formed upon the roots of plants growing in it. The grower must, however, be well versed in the chemistry of fertilizers in order to understand the effect of each ingredient, and know how much of each element of plant-food to apply. It is doubtful if the cost of preparation exceeds or equals that of the compost ordinarily used by gardeners, and it is probable that any crop which responds to the fertilizing influence of chemical manures in readily available form, may be produced from a soil of coal ashes and peat-moss, especially under glass, where all atmospheric conditions may be controlled.

Agric'l Experiment Station, New Haven, Conn. *W. E. Britton.*

The Vegetable Garden.

AT this season, when frosts have destroyed all tender crops, the vegetable garden makes an untidy appearance unless the plants are promptly cleared away. Too often they are left on the ground and are an eyesore until spring. Of course, such habits are unknown on well-regulated places, but many gardens only look tidy when the ground has been dug and cropped in April or May, and thus weeds are allowed to exhaust half the nourishment from the soil. Wet, sunless weather has recently interfered with outdoor work, but as soon as the ground has dried off we shall clear away any remaining useless crops and hoe the weeds clean from all fallow ground.

With the coming of colder weather Celery must be well earthed up on a dry, sunny day, when the soil is not wet or pasty. The early varieties, such as Paris Golden and White Plume, which have been blanched by boards, should be banked with soil or have hay or leaves scattered over them. As a rule, we do not have severe frost until December, and the two varieties named give us a supply until Christmas, and Giant Paschal, Kalamazoo and Boston Market are depended upon until about the end of March. Much has been written about methods of storing and preserving Celery for winter use, but there can be no question that if a sweet, nutty flavor is desired the plants must not be disturbed at the roots and stored in a dry cellar. The most satisfactory way to have clean, crisp stalks is to protect the ridges with a thick coating of leaves or seaweed. It is easy to dig into the trenches, even in the most severe weather, and decayed, useless heads are rare if banking and protecting have been carefully adhered to. We work some slaked lime among the soil when we bank up our plants; this serves to keep worms away.

This is a good time to manure and dig over any vacant squares of ground, thus lessening the strain of spring work. For root crops, such as Carrots and Parsnips, which do not grow straight and clean in heavy land, we deeply trench the ground and work in a liberal quantity of sand, road-scrapings and fine coal ashes, in addition to manure. For places where crops have been grown for many years, trenching will be found of great advantage. For Onions the soil should be heavily manured and dug over now and the surface left rough for frost to pulverize it. Onions, unlike most crops, seem to do best on the same land year after year. We have discontinued sowing these outdoors. Our experience of the past three seasons proves conclusively that it pays much better to start the seed in boxes and transplant them in spring. A much heavier and more even crop is secured and no more labor is entailed, all things considered. Danvers Yellow and Red Wethersfield gave us the most even lot of bulbs the past season, although they are smaller than some other kinds. Prizetaker produces extra-fine bulbs, usually of good shape and very solid. I recently saw some specimens of this Onion grown by Mr. A. McIntyre, gardener to Mr. F. N. Washburn at West Harwich, on Cape Cod. Six onions weighed eleven pounds three ounces, the largest specimen tipping the scales at two pounds two ounces. These were grown in sandy soil and liberally supplied with liquid and chemical fertilizers; they were from seed sown the middle of February. Cranston's Excelsior and Ailsa Craig are two English sorts which produce very fine bulbs here and are good keepers.

Brussels Sprouts will stand outside some time yet. We recently broke off all the lower leaves from our plants to give the sprouts more light and air. This desirable member of the Brassica family is being grown more generally as its merits are better known. Cauliflower is still heading up nicely outdoors, but it will soon be necessary to store the heads in cold pits as a safeguard from frost. Parsley and Lettuce have recently been planted in vacant frames for winter supplies, and these are given abundant ventilation on all favorable days. Beets, Carrots, Turnips, Salsify and Parsnips have been lifted and stored in sand in an open shed. A thick coating of dry leaves when colder weather arrives is all that is needed to keep these in good condition during winter. Early Tomatoes in pots now have fruit of a good size, and will commence to ripen early in November. Hand-fertilization of the blossoms during the next three months is necessary to secure a good set of the fruit. A sowing was made early in October, which will give fruit from the end of February onward. Varieties used are May's Favorite, Eclipse and Chemin. The young plants are kept on a shelf close up to the light to make them as sturdy as possible.

Taunton, Mass. *W. N. Craig.*

Notes on Violets.

IN the culture of the various forms of the Neapolitan Violet one meets with new experiences almost every year. Perfect success is rarely attained. It can scarcely be said that the best Violets grown are free from traces of disease. One season a stock may be, to all appearance, in perfect health, and the next it will be badly infested, and the same stock will succeed and fail in different places the same year. The Farquhar we hoped much from, but it is badly diseased in some places, and it, therefore, becomes as unreliable as the Marie Louise, which it was expected to displace. It is curious to note in this relation that runners taken from the Farquhar during early summer from plants which were hopelessly lost later in the season, made good healthy specimens the following winter, and stock from these is quite healthy this autumn, while runners from plants which were healthy last summer are diseased this. I have had to fall back upon the more reliable Lady Hume Campbell. It spots badly at times, and, like all other Violets, is liable to attacks of nematodes, a more insidious foe to battle with than the spot, for, unless we are watchful, these are apt to pass into winter quarters unnoticed on the balls of earth

surrounding the plants. The best-looking plants are often most infested with this pest, and it is hard to make people unacquainted with it believe that such plants are useless. They seldom bloom, though holding their leaves well. All old gardens, where a multitude of plants are grown, are likely to have these gall-forming pests in the soil, and they infest vegetables of many sorts. Although this trouble may be perpetuated by dividing plants, it should not be found on runners rooted in sterilized soil. With care in this respect and in selecting a new piece of ground, we were not troubled with nematodes this season, but have had spot badly in place of it. Where Violets are diseased it is hardly necessary to see them to know this is so. An unmistakably unpleasant odor certifies that fact. I have taken in large handsome plants apparently in the best of health which have later become rotten with disease, to put it truthfully. I thought, as conditions were favorable, I would try a change this season. It is a discouraging task to house diseased plants, and I therefore shook all the soil away from the roots, so that, if they started at all, they would start entirely afresh. All are now quite recovered, with healthy deep green foliage and abundant new roots. I must confess to being a trifle jealous of a neighbor's fine lot, and after he had housed the best plants I was thankful to take the leavings, which were far larger and healthier-looking than mine. I planted them in the same kind of soil as my own, so that, if that had anything to do with either success or failure, I should know it. I put them in a separate lot of frames, and now am glad I took this precaution, for the greater part of them are now a mass of decay. I cannot understand what has saved my Violets from disease. The soil they were planted in was wet. If my plants had been better I should have waited for it to dry out enough to handle. I feared failure, and so took all the chances.

Wellesley, Mass. *T. D. Hatfield.*

Orchid Notes.—I.

THE season for the flowering of Orchids has begun, and the profusion of bloom now is hardly excelled at any time of year. This autumn display would have been impossible five years ago, and even unheard of. The change is due to the introduction of Cattleya labiata and Dendrobium Phalænopsis. Cattleya labiata is of the easiest possible culture, and produces, perhaps, a smaller percentage of poor forms than any other Cattleya. It stands more exposure to the sun also; the leaves made in Brazil are of very thick texture, and can only be reproduced under our system of cultivating them by free exposure to sun and air during the growing season. This Cattleya starts to grow very soon after the flowering is past, and root-action begins at once. If it is necessary to repot the plants, this is best done during the month of December. Last year our plants were all repotted before the end of that month, and out of nearly a hundred not one shows signs of retrogression. As soon as the repotting of C. labiata is done, others will need attention. The repotting should always be done when there are signs of fresh root-action. If the plants are growing in pots they should be well soaked in water for a day or two, when the roots will part from the pot easily and with less damage from breaking than if the compost is dry. Cattleyas are often grown in wooden baskets, but we have abolished them, and use pots only. If the plants are large the pots are perforated to help aërate the material in which they are growing and keep it sweet. It often half-kills a Cattleya to take it out of a wooden receptacle, but if the roots are matted round a pot the pot can readily be broken and the roots detached without great injury. Sphagnum-moss should never be used for Cattleyas; it helps to decompose the Fern-fibre and often holds too much moisture when it is not desired. When left out it is almost impossible to overwater a Cattleya.

Dendrobium Phalænopsis will soon be past flowering, when the stems or pseudo-bulbs will show shrinkage, owing to the strain of producing the long sprays of bloom. This must, if possible, be made good before the plants are at rest, or the start made in spring will be correspondingly weak, and there will also be a loss of foliage that should be avoided, if possible. It has been a question whether this Dendrobium is deciduous or not under normal conditions. It now appears that, if well managed, the plants will retain most of their leaves through the winter with great benefit to the plants. Sick plants will surely lose all the foliage, and the growth will be weaker in consequence the next year. Young plants made from the portions of old stems must be left on until next March, or when the growth commences, and then placed in small pots. They are worth taking care of, for this is one of the most useful Orchids ever introduced to gardens.

The cool-house plants need attention now, as almost all of the Odontoglossums have begun to grow, and now that the hot weather is past for this year and the temperature can be controlled conveniently, the plants must be encouraged to make all the progress possible. To accomplish this, the roots must first be made comfortable. We use a good portion of moss for cool-house plants, as it is easy to clean away the compost without damage to the roots. As a great quantity of water is needed at all times, and the plants should never suffer for the want of it, there is no better index as to moisture than Sphagnum, which assumes a whitish green as soon as it becomes dry. It is an old saying, with truth in it, that "to be able to grow Odontoglossums it is first necessary to learn how to grow Sphagnum-moss." It is customary to pull the Fern fibre to pieces and blend with it about half its bulk of moss. We have found that it is much better to leave the fibre in its original condition and merely shake out the loose earth and use the brown portions. This should be cut into triangular pieces as large as need be; and a few heads of living moss should be inserted between each piece, and it will soon grow and cover the entire surface. It is a serious mistake to use pots too large for the plants, with the idea of encouraging greater vigor by a larger amount of compost. It is an error often made by beginners and cannot be too strongly condemned. The smaller the pot, so that it is large enough, the better the plants will thrive. This is especially applicable to Odontoglossum crispum and its allied kinds. O. grande is now in bloom and is a very useful plant for decorative purposes at this season. It is of Mexican origin and in winter needs a warmer house than the cool house proper, where it thrives well in summer, and even in a shady place out-of-doors if moisture is abundant. It is well to give water all winter at regular intervals to keep the bulbs plump. O. grande is one of the kinds for many years reputed to be hard to keep in good condition; with rational treatment we have found that it is not difficult to grow, but the strain of blooming every year is great, and it is economical to let each plant flower but once in two years. They are easily procured at a nominal price.

Cypripediums of the Insigne type were all out-of-doors from the end of May until the end of September. The pots were plunged in a spent hot-bed under the shade of Elm-trees. The sashes were taken off and the plants sprinkled overhead on hot days. This method has been practiced for several years with good results. The plants flower freely, have a deep green color, and are not forced to make growth at the expense of flowers, as is often the case when the plants are kept in the greenhouse during the hot months. After the flowering is past the plants are rested in a cool greenhouse for a month or two until March, and renewed root-action takes place, and if repotting is necessary it is then done. Cypripediums of this type do not readily come out of the pots when they are full of roots. It is better to break the pots rather than the roots. If the plants are in large pots and it is not desirable to have them larger, they can be maintained in good health for a number of years by giving a little stimulant in the water, such as a very weak solution of sulphate of ammonia or nitrate of soda, or, better still, both at alternate waterings. The invention of the Kenney pump has greatly simplified the application of all liquid stimulants. A strong solution is made in a convenient vessel, and in the use of the pump the solution is blended with the hose supply at any desired strength by diaphragms of various sizes. The temperature can be regulated also by mixing the solution with water warm enough to take the chill off the water as it comes from the main. An invention so inexpensive ought to be better known.

South Lancaster, Mass. *E. O. Orpet.*

Notes on Irises.

THIS being the only season when many of the Irises are offered by the dealers, it seems a good time to answer some inquiries as to their collection and culture. As there are nearly 200 known species of Irises, or 250 including the Cape and south African forms, which are classed by the botanists as Moræas, with an endless number of varieties, it is scarcely possible to generalize about the family without some eliminations. Dismissing the Moræas, suitable only for greenhouse culture, we have a large genus of plants native of the north temperate zone, and with comparatively few exceptions hardy in this latitude. The exceptions are mostly among the bulbous Irises, which, like Iris alata, I. juncea, I. Tingitana, etc., naturally making growth in winter, have their foliage so injured if exposed that they cannot recuperate. Yet other bulbous Irises, as the Reticulata section (except I. histrio), thrive under the same conditions, their foliage not suffering from frost. The hardiness of the rhizomatous Irises depends, with

a few exceptions, on their being suitably planted and well established.

The time of planting, as has been lately noted in Garden and Forest, is an essential point with some few species like I. Hartwegii and I. Macrosiphon, whose habits are peculiar, owing to climatic conditions in their natural homes; and there are some central Asiatic kinds of Oncocyclus and Regelia classes which require special annual treatment. But taking the rhizomatous Irises as a class they may be moved at any time from one part of the garden to another, or from a neighboring garden, if in a growing condition and the ground is not very cold. They seem, as a rule, to endure removal best just after flowering, when a new growth commences. But to establish the same Irises received from a long distance at the beginning of cold weather is another and more difficult matter. The Irises from a distance will have usually come to a complete state of rest, and neither their roots nor leaves are in a condition for action. Often from a distance one receives mere withered rhizomes. To expose such plants to outside conditions is, of course, to invite destruction, for they are practically lifeless masses of albumen. Such dormant pieces should be carefully planted in a frame or cool house, with the rhizomes, if stout, only partly buried and kept cool, but free from frost and rather dry. Under such treatment they will usually revive in due season, and in the spring can be transferred to the borders with safety. Irises like the sun, and it is important that the fast-creeping rhizomes of such as the German Irises should be in a position to be ripened by the sun and kept from overshadowing grasses and weeds. These rhizomes naturally creep at the surface. Other Irises, such as I. cristata, send their thin rhizomes just under the surface, and the soil in which they are planted should be open and adapted to such growth. Still another class of Irises, as I. Sibirica, I. ensata and the Japanese Irises, are furnished with many fine roots and comparatively small rhizomes, and may be planted like any hardy perennial, with no special care for the rhizomes. Irises of this class may be more highly fertilized than the others, the Japanese Irises especially requiring high culture in this particular. Most of the Irises enjoy liberal supplies of water when growing, and often have considerable adaptability, thriving in wet or dry situations. The well-known subaquatic, I. Pseudacorus, thrives equally well on the upland as when its feet are in water.

The bulbous Irises with annual roots, the Reticulatas, the Spanish and the English, are better lifted annually, as they naturally are dormant in summer, and may be injured in wet weather. But those with fleshy persistent roots, known as Junos, of which I. Persica is a type, are best left undisturbed. These thrive best in a rather heavy soil in a southern exposure, rather protected, as they flower early.

Among so many plants it is difficult to advise a beginner as to a selection, but as a start, and avoiding rare sorts, a fair representative list may be made up of the following kinds, named nearly in the order of their flowering, and none of which offer any difficulty in cultivation: Iris orchioides is a very distinct bulbous Iris with beautiful golden flowers, and quite the earliest showy species. After this the dwarf Irises will soon flower, white, yellow and purple forms of I. pumila. Then taller forms, such as I. Chamæiris and I. nudicualis. The bulbous Spanish and English Irises follow in succession, the former showing leaves in winter and requiring liberal supplies of water when growing. I. Sibirica, in several purples and a white form, are also early. The mid-season display of Irises is made by the showy hybrid German kinds, offered in great variety. From a florist's list, if properly described, one may select a dozen kinds, giving a fair representation, to which additions may be made later. I. pallida should not be omitted from any collection. For the later season the main reliance is on the Japanese varieties of I. lævigata, a dozen or so kinds giving a fair representation of the colorings. This is only a small collection, but I refrain from mentioning many beautiful kinds which many will be glad to add as they discover the unfolding beauties of these flowers.

Elizabeth, N. J. *J. N. Gerard.*

Experience with Summer-flowering Plants.

IN well-ordered flower gardens north of the fortieth parallel the plants used for summer decoration have been safely housed before this date, and the planting of hardy bulbs is in many instances completed. The experience of the past season may prove helpful in planning next year's operations. Outdoor Roses in the vicinity of Philadelphia have been satisfactory in most instances; the benefits of thorough watering in dry weather and mulching the beds have again been proved. Even where this extra care was not given, the growing weather of the latter part of the summer induced quite strong growth on established Roses. In a neighboring garden some plants of General Jacqueminot, Ulrich Brunner and Mrs. John Laing bore stout canes from five to six feet tall, which seemed to be ripening up nicely. La France is a general favorite in this locality, and is seldom entirely without flowers from June to the end of November, and in favorable seasons even later. This Rose is not injured severely by the winter here, except in very exposed positions. Hermosa is seen in most gardens, but is frequently winter-killed to the ground. It could probably be carried through in much better condition by laying down the shoots and burying the whole plant in earth. Crimson Rambler has not yet been generally planted in this locality, and the plants used were quite small, so that its full beauty has not yet been seen; there appears to be no question as to its hardiness. If we can grow this Rose to the same perfection that it has been grown during the past summer on some of the noted English estates we have something worth looking forward to. On one place in England a high fence was covered with a mass of Crimson Rambler to a height of eight or nine feet, and was a perfect blaze of color.

Eckford's Improved Sweet Peas have been eminently satisfactory with us the past season, having grown fully six feet high where they were provided with a support of galvanized wire netting. They were covered with bloom from June 30th until frost. They were sown in drills and covered with about two inches of soil, the only fertilizer being a small quantity of chicken-manure worked into the soil before the seed was sown. During dry weather they were thoroughly soaked with water twice a week. Spikes bearing four flowers were not unusual. A bed planted with Canna Egandale and surrounded with a border of Abutilon Souvenir de Bonne occasioned much favorable comment. This Canna is one of the most floriferous varieties I have seen, the spikes large and branching and the color bright red, while its bronzy foliage contrasts admirably with the white variegation of the Abutilon. The newer Abutilon, Lavitzi, is said to be an improvement on A. Souvenir de Bonne. It has not yet been tested as a bedder here, having but recently been offered for sale in this country. Many of the Abutilons are available for bedding purposes and especially adapted for large beds, producing rich effects both in foliage and flowers.

Sanchezia nobilis has appeared to good advantage the past summer planted out in the full sun, having leaves fully one foot long and handsomely veined with bright yellow. The Hydrangea season was cut rather short in this section by a severe hot spell just as the flowers were opening, but the after-colors of the trusses on H. paniculata grandiflora have been very attractive, and show once more the value of this plant in the autumn-color scheme of the garden. H. hortensis is sometimes partly winter-killed in this vicinity unless it is given slight protection. A little further south it does not appear to suffer to any great extent. Some of the finest specimens I have seen were in Wilmington, Delaware, where it seems to be planted quite as freely as H. paniculata grandiflora, and produces immense trusses, the majority of which are tinted blue.

Holmesburg, Pa. *W. H. Taplin.*

Coriaria Nepalensis.—This is certainly a charming plant. From a woody root-stock numerous twigs push up in spring. These are clothed from bottom to top with alternate heart-shaped bright green leaves, each about an inch across and set close to the stem. The plant thus forms a cheerful-looking bush three feet in height. The flowers appear in graceful nodding spikes at the end of each twig and are insignificant. Later, they rapidly develop into beautiful fruits of a bright deep yellow color, hanging from the twigs like currants. Imagine a small bush with bright green leaves, supporting a dozen of these nodding spikes six to eight inches long, each spike carrying about fifty of the small shining fruits of a deep crystalline yellow, and you may get some idea of its striking beauty. It is quite hardy here, and during summer new shoots are constantly coming on, so that its bright fruits are seen until November.

Baden-Baden. *Max Leichtlin.*

Late-flowering Begonias.—A recent allusion in Garden and Forest to the pretty little autumn-blooming Begonia Natalensis reminds me to say that it is establishing itself, as B. Evansiana has done, under the benches in the greenhouse, where both make the very best kind of a screen. B. Socotrana is another of these fall-blooming species, bulbous in character and especially distinct. The

leaves are peltate and the much-branched panicles bear lovely carmine-pink flowers. It is more useful for cutting than the commoner tuberous kinds, since the female flowers are numerous and persistent. It is seldom one sees it as well grown as recently in a Massachusetts garden, where one whole side of a small greenhouse was made radiant with them. Gloire de Lorraine is a new Socotrana hybrid, and one of the prettiest we have seen. The flowers in form and color resemble those of B. Socotrana. The leaves are more irregular and the habit quite shrubby.

Wellesley, Mass. *T. D. Hatfield.*

Correspondence.

Notes from Germantown.

To the Editor of Garden and Forest:

Sir,—Just now the grounds here are singularly beautiful with autumn foliage and bright fruits. Individual trees of the American Hornbeam vary greatly in the autumn coloring of their leaves, but in large collections some of them are a flaming red. The European species hardly color at all here. About Germantown the Liquidambar, or Sweet Gum, is now surprisingly beautiful. It delights in a situation where it can have full sunshine, and it ought to be in a damp place to insure its best growth and richest color. The Japanese Snowball, Viburnum plicatum, has been largely planted for its flowers, but it has a variety known here as rotundifolium, which is now strikingly handsome. The plant blooms rather earlier than the type and its flowers are rather larger, but at this season the leaves turn to a singular yellowish scarlet and give it a high value among shrubs used for autumn color.

The leaves of Photinia villosa turn to a bright scarlet, but in well-established plants the fruit is also very showy at this season. The berries are not large, but they are very abundant, and they ripen to a deep scarlet and remain in this condition for a considerable length of time. Our common Chokeberry, Pyrus arbutifolia, is an attractive shrub in spring for its clusters of white flowers, but it is equally beautiful in autumn when covered with its clear red fruit. It is one of the plants that improve wonderfully under cultivation, and one who has only seen it in the woods will hardly recognize it when planted in good rich soil and well cared for. It becomes a compact bush and produces fruit much more freely. This is also true of our wild Roses, R. Carolina and R. lucida, which, when cultivated, are loaded with their bright hips. This year they have outdone themselves, and their branches are fairly weighted down with fruit.

The violet-colored berries of Callicarpa purpurea are now very striking in plants which have been properly treated—that is, when placed in an open situation in damp rich soil and cut nearly to the ground in spring. This compels them to throw up strong shoots which are now loaded with fruits. Lycesteria Formosa is still showing its pendent racemes of reddish berries and is a first-rate ornamental shrub, although it is somewhat tender here. Its tips winter-kill, but when it is cut back it flowers freely in late summer from the shoots it throws up from below. The creeping Daphne, D. Cneorum, is in flower from spring to fall, and just on the verge of freezing weather it seems to be as full of bloom as ever. Its roots are very slender and they seem to like to wander in light soil and can find nourishment in almost clear sand. The flowers when cut now display their characteristic odor.

Germantown, Pa. *Joseph Meehan.*

Smilax for Florists' Use.

To the Editor of Garden and Forest:

Sir,—In your excellent article on the "Change of Fashion in Flowers" you omitted to speak of Smilax, Myrsiphyllum asparagoides, and I beg the privilege of calling your attention to it as a plant of comparatively recent discovery for florists' use. It was in the early seventies that Smilax first came into prominence for use in cut-flower work. Its use in festooning the handles of baskets, filling in bouquets, and the groundwork of baskets of flowers was one of the most potent factors in changing the set, stiff arrangement to the natural and graceful manner that obtains to-day. Long before its introduction, fault was found with the prevailing method of arranging flowers, but the material was not at hand to effect the desired purpose; Smilax supplied the want, and so the florists were enabled to make light, graceful bouquets and baskets.

It is interesting to note the rivals which have arisen in opposition to Smilax. First, the Climbing Fern, Lygodium scandens, then Asparagus tenuissimus, and later A. plumosus, the first two having passed out of existence because they wilted too rapidly after being cut, but the third mentioned has obtained a foothold and divides the field with Smilax to-day. Maidenhair Fern, Adiantum cuneatum, has also been called into use for many purposes for which Smilax was originally used, and so, while the quantity of Smilax grown is getting larger annually, because of the increased market, yet its development is not in proportion to the market because of the place filled by other plants.

New York. *Patrick O'Mara.*

Orchids on Mount Desert.

To the Editor of Garden and Forest:

Sir,—I found two interesting Orchids abundant in woods and fields of Mount Desert in early October. The first is Goodyera repens, more commonly called the Rattlesnake Plantain, with curiously reticulated white-veined, blue-green, velvety leaves and slender greenish flower-spikes and dainty cream-colored, waxy flowers. The plants were thickly set among trailing Snowberries, shining Mitchellas and yellowing Ferns, and wearing that air of aloofness which distinguishes all Orchids from the cheerful familiarity of Asters and Golden-rods. The author of *Orchids in New England* says he seldom sees the Rattlesnake Plantain in flower, and cites an experienced botanist who had searched in many different places and never came across a flowering plant in three years; but I found them on the island flowering in great profusion. I was fortunate, too, in transplanting them not only into window-boxes and baskets, but into the shady corners of a garden, where they have rewarded me by flowering bountifully.

The second autumnal Orchid, Spiranthes cernua, Nodding Ladies' Tresses, is much more conspicuous and more positively beautiful. In the meadows of eastern Massachusetts I have often seen it close to the exquisite blue-fringed Gentian. Although most common in damp meadows it sometimes grows on uplands among Pennyroyal and Sweet Fern, or makes a conspicuous setting for the purple cross-leaved Polygala. The very roadsides in some parts of Mount Desert are white with their flowers, and the honey bees find them delightful to the very last day of their existence and often follow them into a sunny room, where, in water, they last for a fortnight, and if set against a background of brilliant Maple-leaves, the gleaming berries of the Hobble-bush or Wild Mountain Ash, they are charming indeed.

Andover, Mass. *Annie Sawyer Downes.*

Recent Publications.

How Birds Affect the Farm and Garden. By Florence A. Merriam.

This is a little pamphlet of thirty odd pages, which sets forth, as the sub-title announces, a series of facts determined by investigation of the food habits of our common birds, showing their character as insect destroyers and their value as allies of the farmer and fruit grower. There are many sentimental reasons which can be urged against the slaughter of birds which do so much to enliven our landscapes with their beauty of form and color and their grace of movement, and to fill the air with their melody. These reasons ought to suffice to make every woman of sensibility shudder at the thought of being in any way a *particeps criminis* in the murder of these innocents for the sake of their plumage for the ornamentation of bonnets. There are economic considerations, however, besides the others, and the studies of ornithologists have demonstrated that our song birds and, indeed, all except the English sparrow, are essential to prosperous agriculture and horticulture for their aid in suppressing noxious insects. Miss Merriam has brought together a great mass of testimony collected by the Division of Ornithology at Washington, and by naturalists in the various experiment stations, who have been studying the relations of birds to insect life, to show how tirelessly and efficiently these allies of man help to protect his fields and gardens and orchards and vineyards from insect ravages. The paper was originally published in *Forest and Stream*, of this city, and it will be supplied for distribution from that office at cost. Single copies of the pamphlet can be had for five cents, and it ought to be placed where every farmer's boy in the country can read it.

Notes.

The orange crop of Louisiana is estimated at 20,000 boxes, a slight increase over last season, and about one-seventh of the output previous to the damage by freezing two years ago.

Mr. J. H. Maiden has been appointed Government botanist and director of the Botanic Garden at Sydney, in succession to Mr. Charles Moore, who has recently retired after a service in these capacities of nearly half a century.

Last week the American Gardeners' Society was organized at a meeting held in Madison Square Garden, with J. M. Hunter, Hempstead, Long Island, President; Wallace G. Gomersall, Fishkill-on-Hudson, New York, Vice-President; James I. Donlan, New York, Secretary, and R. Butterbach, Oceanic, New Jersey, Treasurer. The purpose is to establish branches of the society in various sections of the country; its future course, however, can hardly be predicted until it is in more complete working order.

A Florists' and Gardeners' Club has recently been organized in Morris County, New Jersey, with A. Herrington, gardener to H. McK. Twombley, as President; W. Duckham, gardener to D. Willis James, as Vice-President; William Charlton, Treasurer, and William H. Thomas, gardener to A. P. Whitney, Secretary. The club consists at present of about forty members. The monthly meetings will be held in Madison, with an exhibition in the Lyceum at Morristown on November 10th, 11th and 12th. Several gentlemen with large estates have promised the project their hearty support.

We learn from the *Public Ledger*, of Philadelphia, that a well-known Pecan-tree, said to have been the product of seed brought to Germantown by Nuttall nearly a century ago, and probably the first specimen of its kind planted in this part of the country, is to be cut down. The tree had grown to a great height and was one of the most famous in Germantown, where famous trees abound. It is located on what is now the grounds of a new Methodist Episcopal Church, and when the land was purchased it was decided to save the tree, for which purpose the architect designed the building so that it could be left standing. Recent heavy storms, however, have caused the tree to lean heavily toward the church wall, so that damage is threatened to the structure and orders have been given to have it removed.

What is really a manual of practical entomology has been issued by the West Virginia Experiment Station as Bulletin No. 44. It explains in a popular, but accurate, way how to determine whether any loss or injury to crops of farm or garden is caused by insects and how to detect the special insect which causes it. The insects themselves are briefly described, and the best defenses against them, so far as known, are plainly stated. The bulletin can be used as an elementary guide to the study of common insects and the character of their work, and it will be useful for busy farmers and gardeners who want a handbook of reference which contains plainly stated information about the more important features of insect-life and its relations to plant-life. The bulletin was prepared by Dr. A. D. Hopkins and W. E. Rumsey.

Delaware and Niagara grapes are less plentiful and less evenly good than those of the other well-known varieties, and the best bring twenty and twenty-five cents for a small basket. Concords and Catawbas, fresh and sound, are now selling at retail for ten cents for a basket weighing four pounds, and eight-pound baskets of Concords of the same high quality may be had for fifteen cents. These prices must mean not only small margins for the wholesale and retail city dealers, but very meagre profit to the cultivator. Kelsey plums, large, firm and beautifully colored, are still seen in collections of choice fruits, and command seventy-five cents a dozen. Hothouse tomatoes, from the interior of this state, are selling for fifty to sixty-five cents a pound. Sugar-cane, from Louisiana, is seen in some of the fancy-fruit stores, the long stalks selling for five cents each.

We have received the first number of *Florilegium Harlemense*, an illustrated work on cultivated bulbous plants, published under the auspices of the council of the Algemeene Vereeniging Voor Bloembollencultuur. The work is of quarto size, and the flowers of natural dimensions, printed in colors on a rather light brown paper. The first plate contains the Single Hyacinth, La Grandesse, which, although it was distributed more than thirty years ago, is still the best trade variety of this color. Plate No. 2 contains four Tulips, among which is Keizerskroon, said to be the oldest early Tulip grown, and under the name of Grand Duc it was listed in catalogues 150 years ago. The other Tulips are White Pottebakker, Vermilion Brilliant and Proserpina. Plate No. 3 illustrates three varieties of Narcissus Pseudo-narcissus: Major Maximus, Bicolor John Horsfield and Moschatus albicans. The text is written in French, English, German and Dutch.

Another study of the destructive Potato scab has been made at the Agricultural College of South Dakota by Thomas A. Williams, botanist of the experiment station there, and the report has been recently issued in a bulletin. When the seed is treated with corrosive sublimate and planted in uninfested land no scab was found, and when planted in infested land the same treatment very materially reduced the trouble. The weaker solution, where the corrosive sublimate is used with the strength of about 1 to 1,000, is about as effective and needs less care than when it is six times as strong. The best practice is to immerse the seed before it is cut. The Bordeaux mixture and the so-called Eau Celeste seemed to be effective against the fungus, but it decreased the yield more or less. One point noted was that the thicker-skinned and darker-colored varieties of potatoes seemed better able to resist the attacks of the disease than other ones, and it was once more demonstrated that potatoes should not be allowed to remain in the wet ground long after ripening.

Several new seedling Carnations are now offered by up-town florists, notably Nero, large, clear rose-pink in color, and conspicuously attractive, and Nellie Patterson, with a variegation more showy, perhaps, than even Helen Keller. The flowers are a rich cream-yellow, the fringed petals delicately bordered and regularly striped with bright pink. Both these novelties came from C. Besold, Mineola, Long Island. Masses of beautifully grown Chrysanthemums in florists' windows include among yellow sorts H. L. Sunderbruch and a new seedling of decided merit from Dailledouze Brothers, which they have named Gold Standard. Flowers of the white Mrs. Henry Robinson are altogether the largest and handsomest chrysanthemums now in season, but none are more beautiful than Pink Ivory, the petals deepening in color from the tips to a delightful rich pink at their base. Large plants of heavily fruited Otaheite Oranges are highly decorative features among the plants, and luxuriantly flowered Ericas are seen in compactly grown plants of E. præstans, with white flowers; E. campanulata, tall and slender in habit, with brilliant red, trumpet-shaped flowers, E. hyemalis, pink-flowered; and E. gracilis vernalis, bright red globular flowers.

In a paper read before the meeting of the Association for Economic Entomologists at Buffalo, last summer, Professor Hopkins gave an account of certain studies at the experiment station in West Virginia, looking toward the prevention of injury to shade and forest trees by insects. In one interesting series of experiments different kinds of trees were cut twice every month, year after year, in order to gather evidence as to the proper time for felling timber so as to secure the least possible damage from insect attacks. By observations with an insectary in which hundreds of specimens of insects, representing many different species, were introduced, it was found, among other things, that Hickory and Oak when cut in the winter months is converted into powder by Lyctus striatus, while the same wood cut during the summer months is only slightly damaged. In the same way it is found that certain species of trees cut in July and August are entirely exempt or but slightly damaged by wood-boring insects, while those cut in late autumn or early spring are seriously injured. Professor Hopkins found that a slight injury to the base of a tree by fire offers a most favorable condition for insect attack, which often results in the destruction of the most valuable wood of a tree. The fire burns and kills the bark on one side of the base, which might not be a serious matter of itself, since subsequent growth would heal it over, but these slight wounds are soon infested by various beetles and their larvæ, which by boring convert the inner dead wood into a dry powder, or else their mines afford entrance for the fungus, so that the next fire finds in these wounds a most favorable condition to extend the injury. In this way frequent fires in the same forest often burn entirely through the trunk of a large tree. Fire wounds are almost invariably followed by a decay of the heart-wood, which results in a hollow trunk. In almost every wounded tree which was cut down and split open it was found that the extension of the decay was due largely to insect larvæ which had entered from eggs deposited in the edges of the fire wounds, and that brood after brood of these larvæ, aided by wood-infesting ants, had completely honeycombed the heart-wood for a great distance above the wound, thus rendering it worthless. The paper throughout is very interesting.